

REMARKS

Claims 1-43 are pending.

Claims 1-13, 18, 20-34 and 39-43 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ethington (US 5,681,234) in view of Browning (US 5,261,858). This basis for rejection is respectfully traversed.

Independent claims 1, 20 and 22 have two requirements relevant to this rejection: 1) when the transmission control unit receives a shift command requesting a shift through N speed stages to a requested destination speed stage, the transmission control unit generates information for causing the first transmission and the second transmission to move to a *different destination speed stage*; and 2) for at least one shift command requesting a shift from an origin speed stage to a destination speed stage that requires the operation of both the first transmission and the second transmission, the first transmission and the second transmission are set temporarily in a speed stage outside of a range between the origin speed stage and the destination speed stage.

Ethington discloses an automatic bicycle transmission wherein sprocket combinations representing successively increasing gear ratios may be stored in a table (See, e.g., Table II at column 12), and wherein an electronic controller (72, Fig. 7) operates front and rear bicycle derailleurs (36, 38, Fig. 1) to sequentially upshift from the lowest to the highest gear ratio and sequentially downshift from the highest to the lowest gear ratio. As properly noted in the middle paragraph of page 3 of the office action, Ethington does not disclose a transmission control unit that receives at least one shift command requesting a shift through N speed stages to a destination speed stage, where N is an integer greater than one, such that the transmission control unit generates information for causing the first transmission and the second transmission in combination to move a total of M times to reach the destination speed stage, where M is an integer less than N. Furthermore, Ethington always shifts to the requested destination gear ratio. Ethington does not shift to a destination gear different from the requested gear as recited in independent claims 1, 20, and 22.

Browning likewise discloses an automatic bicycle transmission wherein front and rear derailleurs are operated to produce a desired gear ratio. However, Browning operates to avoid what he terms “illegal gears.” The concept is discussed at column 5, lines 10-52. An illegal shift is a shift from a first gear to a second gear such that the bicycle must transition through a third gear that is not between the first and second gears.

As long as the requested gear is legal, Browning’s system will move the front and rear derailleurs to the sprocket combination that produces the desired destination gear ratio. Sometimes, if the requested gear is illegal, the system will move the front and rear derailleurs to a sprocket combination different from the combination that produces the requested gear, but which produces a gear ratio that is closer to the requested gear than the original gear. See column 22, lines 2-11.

The only reason why Browning moves to a destination gear ratio other than the requested gear ratio is to avoid an illegal destination gear. The Appellant submits that, once it is decided not to implement the concept of illegal gears, as recited in independent claims 1, 20, and 22, there is no reason to modify Ethington’s system to move to a destination gear other than the one requested. In other words, it makes no sense to discard the illegal gear shift prohibition yet still force a shift from gear 6 to gear 3 when requesting gear 4 (for example).

The office action states at page 4, first full paragraph, that the motivation to combine the teachings of Ethington and Browning is “to provide the fastest possible shift between any two gears,” referring to column 4, line 47 through column 5, line 68 of the Browning patent. However, nowhere is it stated in the cited text that Browning’s system provides the fastest possible shift between any two gears. Browning does not seek to minimize derailleur movement and is not at all concerned about reducing derailleur movement.

Thus, there is no reason to perform an illegal gear shift and simultaneously force the rider to accept a destination gear other than the requested gear.

Claims 8-12 and 29-33 were allowed in the prior proceedings, but they have been included in this rejection. Claims 8-12 and 29-33 were not discussed in the office action, and the cited references do not disclose or suggest the subject matter recited in those claims, so it is believed that the

inclusion of those claims in this rejection is a clerical error. Confirmation of the status of those claims is requested.

Independent claim 42 is based on claim 1, but claim 42 clarifies that the information generated by the transmission control unit is based on the least number of movements of the first transmission and the second transmission to achieve the destination speed stage. Neither Ethington nor Browning uses this criteria to generate shift signals.

Claims 14-16 and 35-37 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ethington in view of Browning and Colbert, et al (US 5,213,548).

Claims 14-16 and 35-37 add a speed sensor and an automatic shift control unit that generates shift commands based on information received from the speed sensor. Colbert, et al disclose an automatic transmission for a bicycle that shifts gears according to wheel speed. The office action states at page 8 that the motivation to combine the teachings of Colbert, et al with Ethington and Browning is “to improve efficiency,” referring to column 3, lines 24-28 of Colbert, et al. However, the cited text does not state that the provision of a speed sensor and an automatic shift control unit improves efficiency. It is more likely that Colbert, et al were referring to their previous statements at column 3, lines 6-17 when discussing the *manual* mode of operation that “the invention enables a bicycle user, instead of adjusting two gear levels while operating the bicycle to reach a desired gear ratio, the standard technique in current multiple gear bicycles, to simply push a button to accomplish the same result.” Since claims 14-16 and 35-37 recite an automatic shift control unit, any motivation to apply the teachings of a manual mode of operation is not applicable.

Claims 17, 19 and 38 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ethington in view of Browning and Spencer, et al (US 6,047,230).

Claims 17, 19 and 38 add a cadence sensor and an automatic shift control unit that generates shift commands based on information received from the cadence sensor. Spencer, et al disclose an automatic transmission for a bicycle that generates shift signals based on sensed speed, sensed crank rotation rate, sensed chain tension, sensed bicycle inclination and sensed derailleur positions. See column 6, line 66 through column 7, line 2. The office action states at page 9, last paragraph, that the

motivation to combine the cadence sensor of Spencer, et al with Ethington and Browning is “to increase efficiency and safety,” referring to column 2, lines 1-7 of Spencer, et al. However, the quoted phrase appears in a general laudatory statement. Spencer, et al do not single out crank rotation, as opposed to the combined operation of multiple sensors, as the parameter that improves efficiency or safety, if at all. There is no nexus between the alleged benefit of improving efficiency and safety and Spencer, et al’s crank rotation speed sensor.

Accordingly, it is believed that the rejections under 35 U.S.C. §103 have been overcome by the foregoing remarks, and it is submitted that the claims are in condition for allowance. Reconsideration of this application is respectfully requested. Allowance of all claims is earnestly solicited.

Respectfully submitted,



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